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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/974,975	10/12/2001	Hans Martin Hertz	09/974,975	8104

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EXAMINER	
YUN, JURIE	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 11/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/974,975	HERTZ ET AL.	
	Examiner	Art Unit	
	Jurie Yun	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 October 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-14,18-32,34 and 35* is/are rejected.

7)☒ Claim(s) *2,3,15-17 and 33* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. The amendment filed 10/2/03 has been entered.

2. The objection to the abstract and the 35 U.S.C. 112 rejections to claims 2, 6, and 20 have been withdrawn.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 4-6, 8, 9, 14, 18-21, 34, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haas et al. (USPN 6,190,835 B1).

5. With respect to claims 1 and 14, Haas et al. disclose a method of generating X-ray or EUV radiation, comprising the steps of:

(i) urging a substance (42) through a nozzle outlet (36) to generate a jet in a direction from the outlet (column 5, lines 17-33),

(ii) directing at least one energy beam onto the jet, the energy beam interacting with the jet to generate the X-ray or EUV radiation (column 6, lines 11-14 and column 7, lines 31-33), and

(iii) controlling the temperature of the nozzle by heating it, such that the stability of the jet is improved (column 12, lines 22+).

It is obvious that the outlet is inherently heated by the heat exchanger (Fig. 1, 40), since it is part of the nozzle system (22) (column 13, lines 13+).

6. With respect to claims 4 and 18, Haas et al. disclose the jet leaves the outlet in a condensed state (column 4, lines 66-67).

7. With respect to claims 5, 6, 19, 20, 34, and 35, Haas et al. do not disclose the substance comprises a noble gas which is cooled to a liquid state before being urged through the outlet. Haas et al. disclose the use of a noble gas which is cooled to a liquid state after being urged through the outlet (column 4, lines 6-42). Haas et al. are silent as to the gas being cooled to a liquid state before exiting the nozzle, however, one of ordinary skill in the art would know that this could be the case. Haas et al. disclose (column 4, lines 66-67), "In operation, the process fluid supply line 24 may provide pressurized process fluid 42 in the form of a gas, liquid, or mixture to the nozzle 36." It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Haas et al. invention and have the substance comprise a noble gas which is cooled to a liquid state before being urged through the outlet due to the fact that any form of the target exiting the nozzle is known to be suitable in such a system to produce X-ray or EUV radiation.

8. With respect to claims 8, 9, and 21, Haas et al. disclose the energy beam is directed onto at least one droplet of the jet and onto a spray of droplets or clusters formed from the jet (column 5, lines 17-33).

9. Claims 7, 10-13, and 22-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haas et al. (USPN 6,190,835 B1) as applied to claims 1, 4, and 14 above, and further in view of Hertz et al. (USPN 6,002,744).

10. With respect to claims 7, 13, and 25, Haas et al. do not disclose the energy beam is directed onto a spatially continuous portion of the jet, wherein the energy beam is focused to essentially coincide with the spatially continuous portion over a length thereof. Hertz et al. disclose the energy beam (3) is directed onto a spatially continuous portion of the jet (17), wherein the energy beam is focused to essentially coincide with the spatially continuous portion over a length thereof (column 2, lines 42+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Haas et al. invention and have the energy beam directed onto a spatially continuous portion of the jet wherein the energy beam is focused to essentially coincide with the spatially continuous portion over a length thereof, to improve stability since slow drifts no longer affect the X-ray emission, as disclosed by Hertz et al. (column 2, lines 54-55).

11. With respect to claims 10 and 22, Haas et al. do not disclose the jet is cooled by evaporation to a frozen state, and the energy beam is directed onto a frozen portion of the jet. Hertz et al. disclose the jet is cooled by evaporation to a frozen state, and the energy beam is directed onto a frozen portion of the jet (column 4, lines 26-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Haas et al. invention and have the jet cooled by evaporation to a frozen state, and to have the energy beam directed onto a frozen portion of the jet, as

disclosed by Hertz et al., because any type of target, whether it be in gas, liquid or solid form, would be suitable as long as it yields radiation upon being hit by an energy beam.

12. With respect to claims 11 and 23, Haas et al. do not disclose the energy beam comprises pulsed laser radiation which interacts with the jet to form a plasma emitting the X-ray or EUV radiation. Hertz et al. disclose the energy beam comprises pulsed laser radiation which interacts with the jet to form a plasma emitting said X-ray or EUV radiation (column 3, line 25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Haas et al. invention and have the energy beam comprise pulsed laser radiation which interacts with the jet to form a plasma emitting said X-ray or EUV radiation, as taught by Hertz et al. because this would allow for radiation useful for proximity lithography, if desired (column 3, lines 18-30).

13. With respect to claims 12 and 24, Haas et al. do not disclose the energy beam is focused on the jet to essentially match a transverse dimension of the energy beam to a transverse dimension of the jet. Hertz et al. disclose the energy beam is focused on the jet to essentially match a transverse dimension of the energy beam to a transverse dimension of the jet (column 4, lines 50-54). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Haas et al. invention and have the energy beam focused on the jet to essentially match a transverse dimension of the energy beam to a transverse dimension of the jet, as taught by Hertz et al., because this would ensure stable radiation emission.

14. With respect to claims 26-32, Haas et al. do not disclose the step of performing X-ray microscopy, or performing proximity lithography, or performing EUV projection lithography, or performing photoelectron spectroscopy, or performing X-ray fluorescence, or performing X-ray diffraction, or performing a medical diagnosis with the generated radiation. Hertz et al. disclose these procedures (column 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Haas et al. invention to include the step of performing X-ray microscopy, or performing proximity lithography, or performing EUV projection lithography, or performing photoelectron spectroscopy, or performing X-ray fluorescence, or performing X-ray diffraction, or performing a medical diagnosis with the generated radiation, so as to broaden the industrial applicability of the invention.

Allowable Subject Matter

15. Claims 2, 3, 15-17, and 33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, as cited in the previous office action.

Response to Arguments

16. Applicant's arguments filed 10/2/03 have been fully considered but they are not persuasive. Applicant's believe that the new recitation, "by heating the outlet", defines patentably over the cited references. However, Haas et al. heat the outlet indirectly by

the heat exchanger (40) which is part of the nozzle system (22). Haas et al. disclose (column 13, lines 13+), "In operation, the heat exchanger 40 may have to add or remove heat as necessary to keep the nozzle 36 warm enough so that the nozzle 36 does not clog..." It is evident that the outlet, which is a part of the nozzle, is heated indirectly by the heat exchanger.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jurie Yun whose telephone number is 703 308-3535. The examiner can normally be reached on Monday-Friday 8:30-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 703 308-4858. The fax phone number for the organization where this application or proceeding is assigned is 703 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0956.

Jurie Yun
November 6, 2003

Craig E Church